

Fast Battery Charger Using Solar Panel & Mains

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Abstract - With the extending omnipresence of electric vehicles, there is a squeezing enthusiasm to shorten the charging time, so the snappy battery chargers are required. The path in which power is passed on to the batteries is key to battery life, in this way a charger joins a control circuit for battery control organization. Earlier the issue stood up to by the battery chargers were huge electric supply need, unpredictability, mass size and no differentiating alternative to charge battery. To sidestep above issues the battery charger is arranged. The structure relies on upon the two supplies one is essential supply and other is daylight based power supply. Power is passed on to battery through limit corrector, stabilizer, voltage controller and besides the present controller. These all segments are careful to charge battery in less time. Similarly there is auto-cutoff circuit which auto change the charger from ON state to OFF state and the a different way.

Key Words: LCD, LDR, Rechargeable battery, ATmega 328, Servo motor, photovoltaics, gauge, lead acid, Controller.

1. INTRODUCTION

A battery is comprised of various cells. A lead-corrosive cell produces around 2 volts. Little batteries contain 6 cells in a compartment which include to give 12 volts at the terminals. Bigger cells are very overwhelming and individual cells are associated together 'in arrangement's to make batteries of either 12 volt (6 cells) or 24 volt (12 cells). In spite of the fact that a battery is known as a '12 volt' battery, its voltage shifts from around 12.6 volts down to 10 volts when it is releasing and can ascend to 15 or 16 volts amid charging. It is vital, be that as it may, to confine the most extreme battery voltage amid charging generally the battery will be harmed. The battery voltage should not outperform 13.8 volts for long extends and 14.4 volts for brief periods (8 hours greatest). There are numerous conceivable methods for showing how sun powered vitality can be utilized.

1.1 Existing System

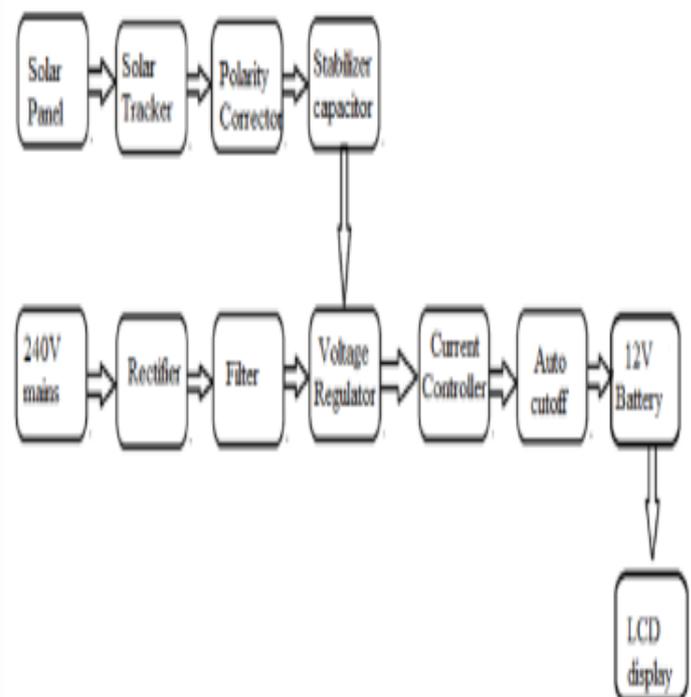
This thought begins with an inspiration for the electric portability and presents the charging strategies and additionally today's accessible charging framework and the necessity. For a ultra-quick charging station for electric

vehicles, condition of research methodologies with vitality stockpiling are abridged. It exhibits the plan perspectives for a ultra-quick charging for electric vehicles from which ideas for the acknowledgment are produced and the details and necessities for the converter framework and the vitality stockpiling can be expressed. The vehicle battery chargers associated with an optional dissemination circuit frequently raise voltage direction concerns both in the essential appropriation lines and auxiliary wires.

1.2 Proposed System

The solution to the above problem is that by using the solar panel and mains supply alternately we can charge the battery of 12V/1A with fast speed within less (8 hours) time compared with predefined time (12 to 14 hours) required to charge it with designing same circuit for both solar panel and mains.

2. Block Diagram



2.1 Transformer

A transformer (15V,3 Amp.) is a gadget which changes high voltage AC into low voltage AC or the a different way. The guideline inspiration driving why we use transformer in the structure are according to the accompanying We have to diminish the voltage level which we get from the AC mains. So the voltage is first wandered around the transformer and the diminished voltage is associated with the rectifier territory.

2.2 Regulator

The LM317 has three pins: INput, OUTput, and ADJustment. The device is insightfully an operation amp with a by and large high return current breaking point. The changing commitment of the amp is the modification stick, while the non-reworking data is set by an inside bandgap voltage reference which makes a relentless reference voltage of 1.25 V.

2.3 Solar Tracker

Sun powered following means when sun ascends from east to west sunlight based tracker tracks the way of sun step by step with sun turn. Tracker is named as Light Dependent Resistor (LDR) which tracks heading where the most extreme power of light. It offers flag to controller and controller pivots the engine through engine driver. Likewise alongside LDR there is sun powered board collected with it which sucks the sunlight based vitality from sun pass it to charger circuit.

2.4 Current Controller

The measure of electric current that goes through a circuit relies on the voltage drives the current and the resistance restricting the stream of current Circuit is proposed for specific voltage and resistance so that the present stream will be known. If the current is excessively broad, the glow can hurt the circuit. Surely, even with circuits planned to suspect such conditions, for instance, when wires touches each other shockingly.

2.5 Auto Cutoff

Which fundamentally utilized for exchanging of the circuit from ON state to OFF state contingent upon battery status .it comprises of hand-off which is associated in parallel with the diode changing to ON to OFF state.

2.6 Rechargeable battery:

The lead corrosive battery utilizes the steady present/consistent voltage technique. A managed current raises the terminal voltage until the upper charge voltage

cutoff is come to, and soon thereafter the present drops because of immersion.

3. Experimental Setup



4. Results and Performance analysis

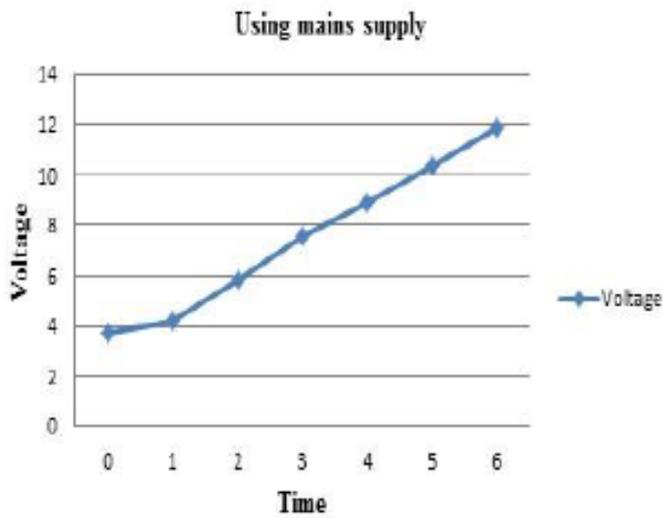
4.1 Using Mains supply



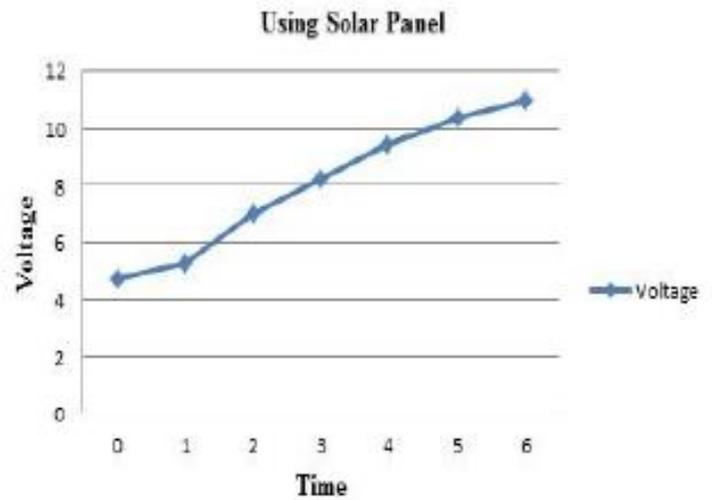
The voltage and time duration after every hour were noted using the mains supply are noted in tabular form as shown in Table.1 below,

Table.1 Observation table for mains supply

Sr. No.	Time	Voltage
1	Initial value	3.71V
2	After 1hr.	4.20V
3	After 2hr.	5.87V
4	After 3hrs.	7.60V
5	After 4hrs.	8.90V
6	After 5hrs.	10.37V
7	After 6hrs.	11.86V



The graph is plotted for the above values of voltage and time shown in table.1,



The graph is plotted for the above values of voltage and time shown in table.2,

4.2 Using Solar Panel



The voltage and time duration using solar panel are noted down in tabular form as shown in Table.2 below,

Table.2 Observation table for solar panel

Sr. No.	Time	Voltage
1	Initial value	4.71V
2	After 1hr.	5.25V
3	After 2hrs.	7.03V
4	After 3hrs.	8.24V
5	After 4hrs.	9.43V
6	After 5hrs.	10.37V
7	After 6hrs.	10.98V

5. Conclusion

The time required to charge a 12V rechargeable battery using mains supply is 6hrs. from initial condition and the time required to charge using solar panel is 6hrs from initial condition. The charging speed by using mains supply and solar panel. The actual time required to charge the 12V rechargeable battery is 12-13 hrs. but this system can be used to charge the battery in just 8hrs 20min approx. So it is conclude that using this project the time required is much less than the predefined time which is 12 to 13 hrs.

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